

AUTOMATIC GENERATOR VOLTAGE REGULATOR



**Model: SS15A-2
Operation Manual**

1. GENERAL DESCRIPTION

Epoxy sealed model SS15A-2, 15 Amp voltage regulators is a General Purpose Heavy Duty AVR that will work singly or in parallel with almost any large brushless generator without a PMG.

Electrical Specification

Basically there is no limit to how low in Ohms a Voltage Regulator can go. The important is not to exceed continuous Amps rating of the model AVR you are using. Most alternators exciter runs under 45 V-DC at full load. We can say “statistically” that the minimum resistor value should be around 3 Ohms for McPherson Model SS15A2 working with a maximum 45 volt output.

Remember Ohms= Voltage/ Current.

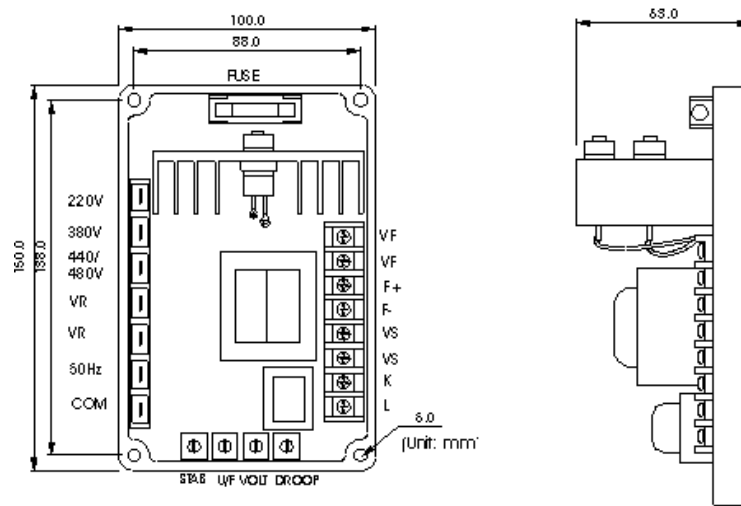
Also remember that most Voltage Regulators become unstable when working at 15 to 20 volts output. If this happens add a resistor in series with the field to work the AVR at higher voltages.

power input & sensing:	VF:100~300VAC VS:220V, 380V, 440/480V
output:	Current- Continuous 15A dc Transient 20A dc for 30 second
regulation:	±1%
exciter field resistance:	4.2 ohms minimum with a 63 volt output
external voltage adjustment:	10% with 1000 ohms potential meter minimum 0.5 watt rated
Residual Voltage:	Over 5V 25Hz residual voltage is required to build up from the generator
Paralleling Provisions:	CT input for customer supplied 5 Amp nominal CT.
Under Frequency	On 50Hz operation- output voltage attenuated at aprox.45Hz.

Protection:	On 60Hz operation- output voltage attenuated at aprox.55Hz.
Operation Temperature:	- 10C to 60C
Storage Temperature:	- 20C to 85C
Size:	150 mm X 100 mm X 63 mm
Weight:	650g
Voltage Soft Start function	

2.

3.



(Outline Drawing Figure 1.)

4.

5. NOTICE OF USE

3-1

The SSEA15A-2 can be mounted in any place like, inside generator control panel, switchgear cabinets, etc. Try to prevent high temperature, high moisture, and /or severe vibration location. See figure 1 for mounting dimensions.

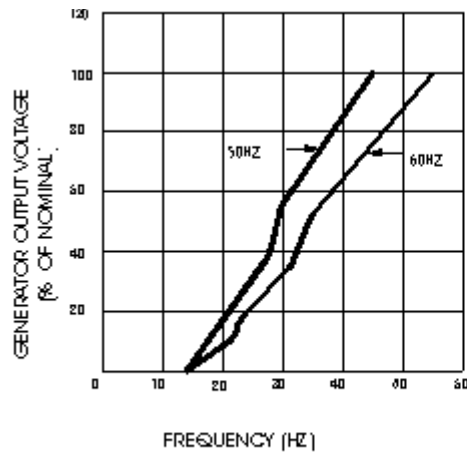
3-2

The SSEA15A-2 surface temperature can not be over 60C when in operation. **DANGER HIGH VOLTAGE** do not touch the heat sink

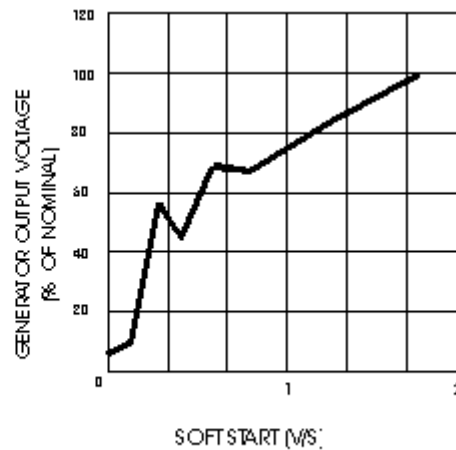
3-3 STARTUP PROCEDURE

1. Ensure all the wires of the regulator are correctly connected and the proper fuse (15A250V) is installed.
2. Turn voltage adjustment potentiometer counter clockwise to lowest voltage level.
3. If used, turn external voltage potentiometer to a centered position.
4. Turn stability potentiometer clockwise to highest stability level.

5. Connect an 110VDC meter across the exciter fields observing proper polarity.
6. Connect a 300VAC meter from line to neutral of generator output.
7. Start and run the generator at no load and at rated speed. The generator output voltage should build up to a minimum level. If the voltage does not build up, it may be caused by low residual generator voltage. Refer to field flashing section in generator manual.
8. Slowly adjust voltage potentiometer until the generator voltage reaches the proper value.
9. Turn the stability potentiometer clockwise until instability is shown, and then turn it counterclockwise slightly until both meters mentioned in (5) and (6) are shown to be stable.
10. Interrupt regulator power for a short time (approximately 1 to 2 second). If the voltage is still stable, the adjustment is now completed. Otherwise increase the stability slightly, and repeat procedure (10) until stability is reached.



(Frequency Compensation Curves Figure 2.)



(Soft-start Curve Figure 3.)

6. ADJUSTMENTS

4-1 FREQUENCY ROLL-OFF ADJUSTMENT (Normally Factory Preset)

For 50 Hz operation connect a jumper from “COM” to the “50Hz” terminal. For 60Hz operation do not use the jumper. To adjust the frequency roll-off, proceed as follow:

1. Set the engine speed to normal RPM for the desired frequency compensation (corner frequency roll-off) point.
2. Adjust the front panel FREQ control until the output voltage is about 5V less than nominal voltage. (For 50Hz operation, the roll-off frequency is factory set to 45Hz, and for 60Hz operation, the frequency is 55Hz).

4-2 VOLTAGE ADJUSTMENT

3. Adjust the front panel “VOLT” potentiometer to set the generator voltage.

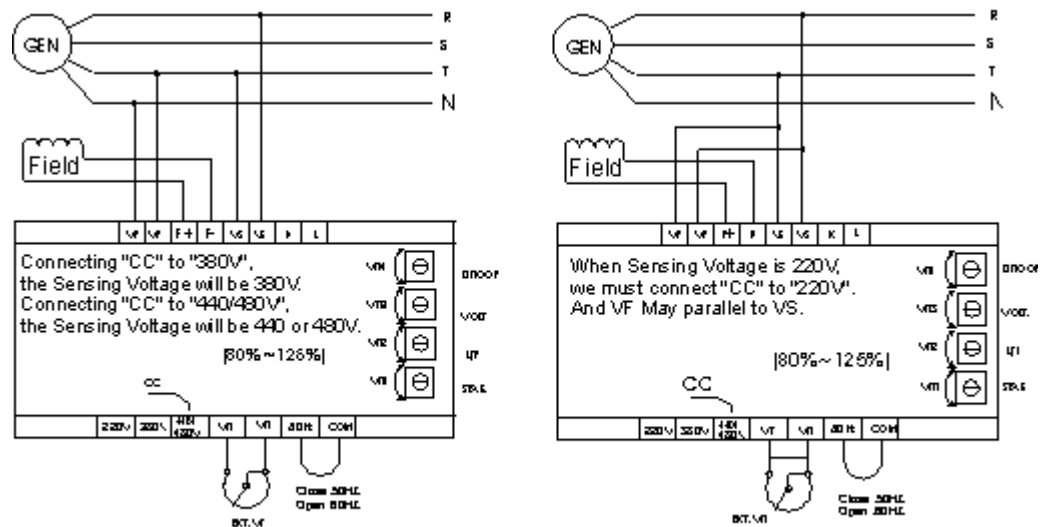
- If needed 1K~1.5KW 1/2 watt potentiometer may be connected to terminals VR and VR, for remote voltage adjustment. Refer to figure 4.5.

4-3 STABILITY ADJUSTMENT

- Adjust the front panel "STAB" potentiometer control for generator stability.
- Turn potentiometer counter-clockwise (CCW) for rapid generator load response.
- Turn the "STAB" potentiometer slowly (CCW) until the system STARTS oscillating.
- Turn the "STAB" potentiometer slowly (CW) until the system STOPS oscillating.

4-4 DROOP ADJUSTMENT FOR PARALELLING OPERATION

The droop control allows for adjustment of the amount of droop, which will occur in the generator output voltage for a given amount of reactive load current. A CT should be selected which will supply the A.V.R with 3 to 5 AMPS of current at rated generator load. The 5 Amps of current supplied is connected to terminal L and K and the amount of droop can be adjusted from 0 to 6% of nominal generator voltage.



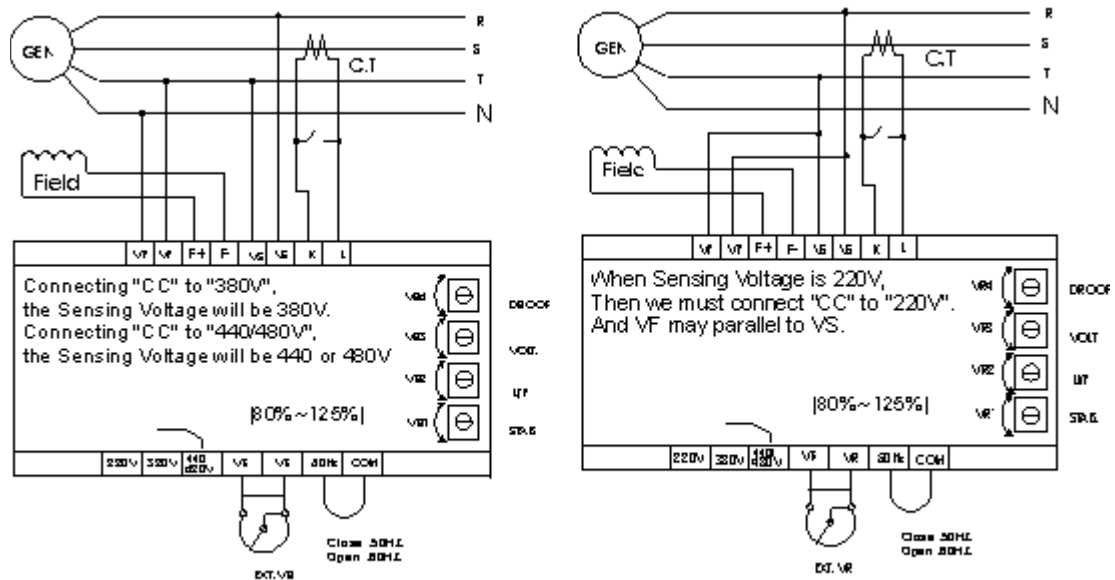
[No Current Compensation Diagram Figure 4.]

7. FLASH WITH BATTERY

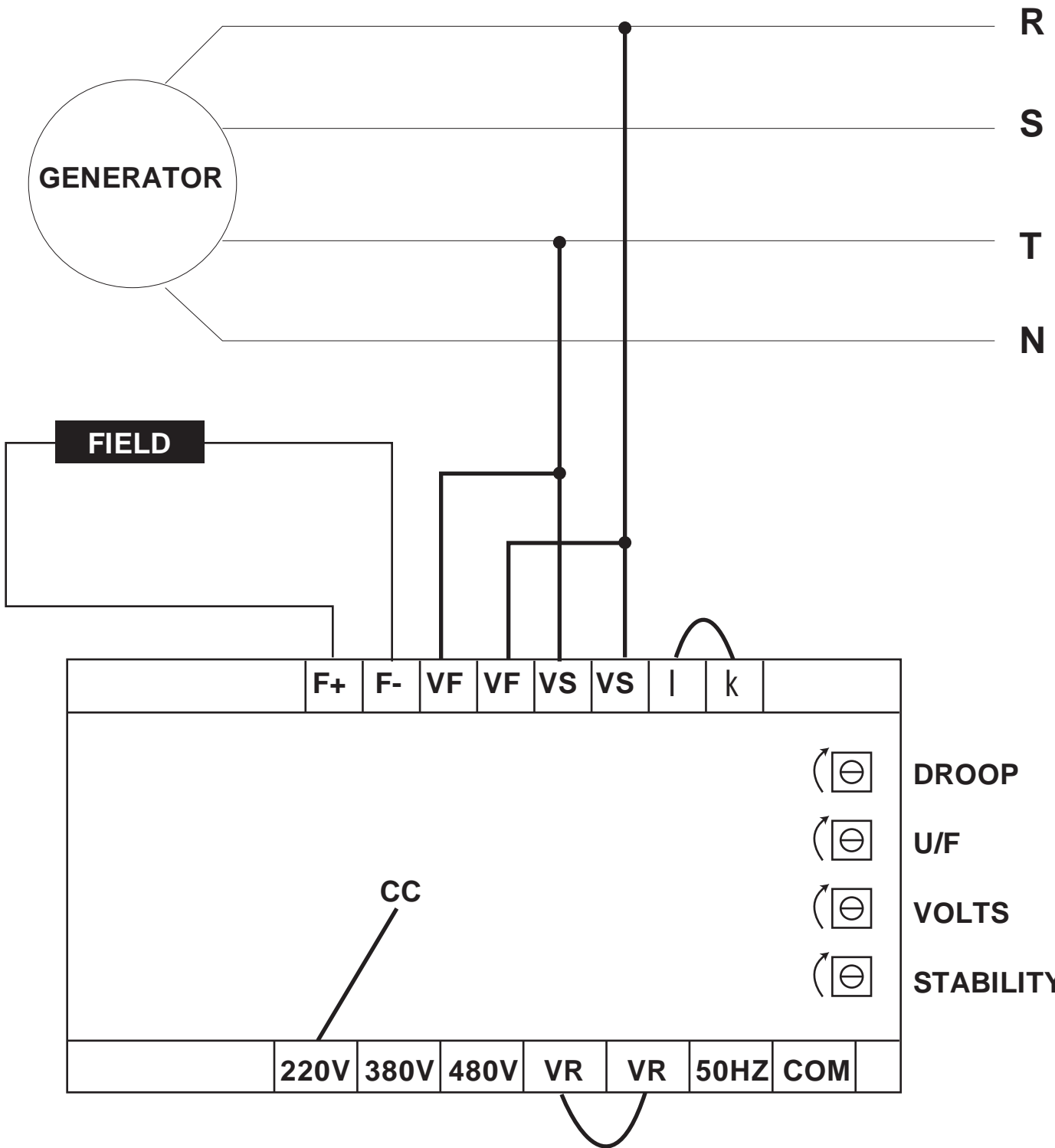
When lack of residual generator voltage occurs flash field with 3~24VDC when generator is running. Stop flashing when output is 30% of the nominal voltage.

8. WIRING (REFER TO FIGURE 4,5)

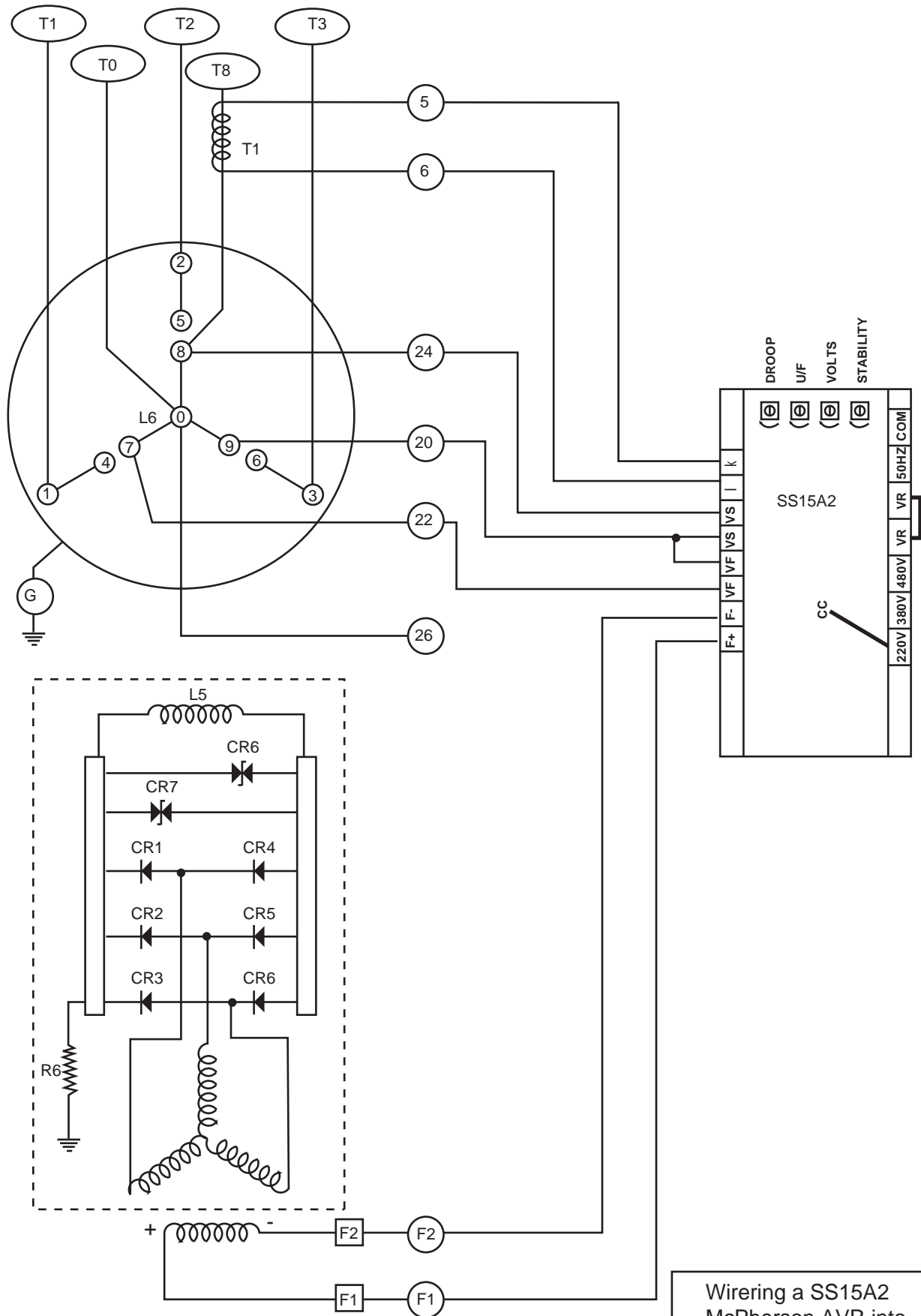
(1) Terminals F+ & F-	the DC output port of the regulator F+ is positive normally connected to the field of generator marked F+, F1 or J F- is negative normally connected to the field of generator marked F-, F2 or K
(2) Terminals VS & VS	The power and sensing port of the regulator (Sensing voltage had been setting on 220V, if you need another voltage input, please select the correct input terminal that you want.)
(3) Terminals VR & VR	For external voltage adjustment if required.
(4) Terminals 50 & COM	under frequency protection selection connect a jumper from COM to the 50Hz terminal in 50 Hz system, or disconnected them in two terminals unconnected for 60Hz operation



| Current Compensation Diagram Figure5. |

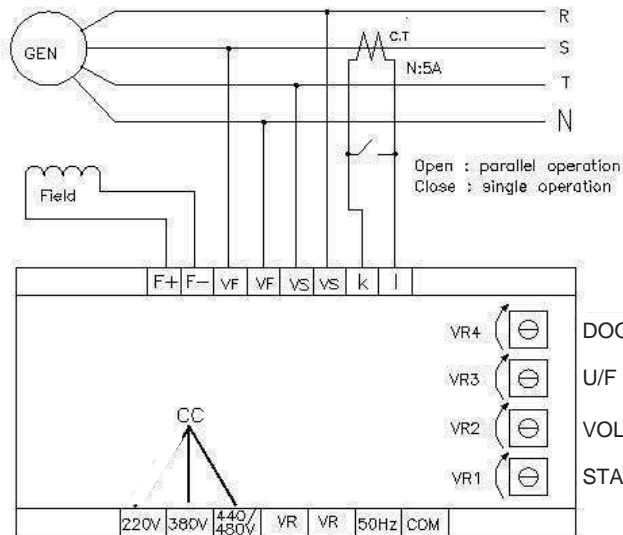


**THIS IS THE MOST COMMON CONFIGURATION FOR USE
IN SINGLE PHASE 240/120 AND 3 PHASE 208/120 VOLTS**



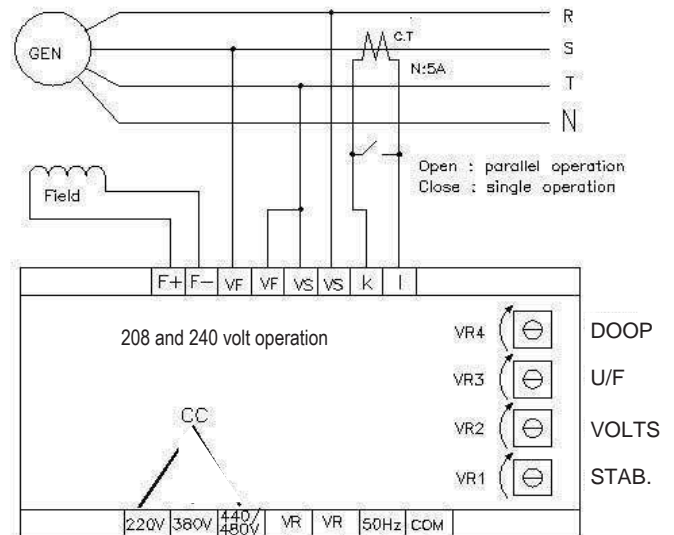
Wiring a SS15A2
McPherson AVR into
any SR4 Caterpillar
Generator

SS15A2 Set Up



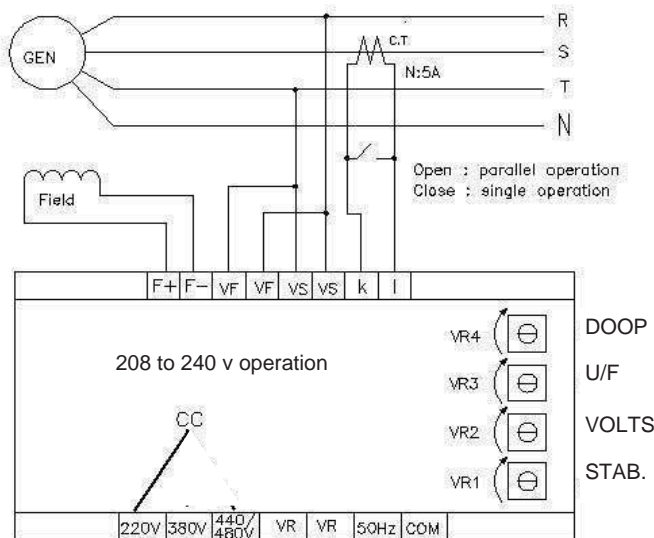
potentiometer for external voltage adjustment -5K/1W

EXT. VR



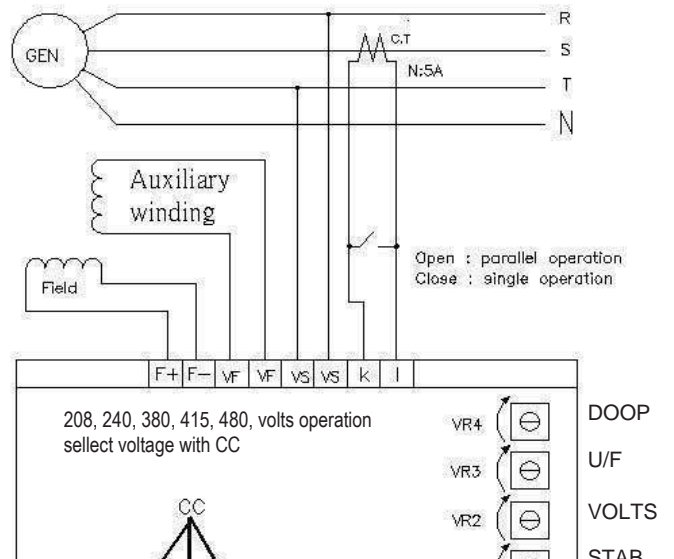
potentiometer for external voltage adjustment -5K/1W

EXT. VR



potentiometer for external voltage adjustment -5K/1W

EXT. VR



potentiometer for external voltage adjustment -5K/1W

EXT. VR

DROOP : droop adjustment
 VOLT : voltage adjustment
 U/F : under frequency adjustment
 STAB. : stability adjustment

VS : sensing voltage range 220/380/440/480VAC ($\pm 10\%$)
 VF input power range 120 - 280VAC (phase - N or phase-phase)
 F+,F- output power MAX 95VDC (at input 220VAC)
 NOMINAL CURRENT OPERATION 15ADC
 PEAK CURRENT (max.10 sec) 25ADC

CC-220V : (VS)sensing 220VAC
 CC-380V : (VS)sensing 380VAC
 CC-440/480 : (VS)sensing 440 or 480VAC
 50HZ-COM : OPEN=60HZ
 COLSE=50HZ